SEC-TMP-DLD

S/W Detailed Level Design

Project Name			
Block Name			
Author		**Approver**	
Team			

Name
Date

S/W Detailed Level Design

This document represents Detailed Level Design (DLD). It describes the detailed system design and implementation plan in alignment with Agile principles. The DLD is updated incrementally with each release to reflect system evolution.

Contents

■Revision History

Version	Date	Revised contents	Author	Approver

■Terms and Abbreviations

Term	Description

■References

1. SW Requirements Specification

1. Overview

<This section provides an overview of the system and its purpose. It defines the scope, main objectives, and the role of this document within the project. It should briefly describe the system

context and identify the key stakeholders and user roles.>

The main purpose of this software is to optimize the workflow of the Photo Studio project.

The software system will also record orders in a centralized manner, track their completion and the related income and expenses for logging and to give a revenue report to the studio administrator.

The system is meant to allow the receptionist to:

- Create clients in the system
- Easily create orders with the client data.
- Generate automatically two types of orders (Client and photographer)
- Easy access to client orders.
- Automatically calculate the price (meaning the surcharge) and mark an express order automatically.
- Have centralized mappings with all the orders recorded.
- Create and submit the daily revenue reports easily.

The system will allow the photographer to:

- Submit a report on consumed materials at the end of the day.
- Submit the completion of an order.

The intended users are:

- the client
- the receptionist
- the photographer
- the studio administrator

Scope:

The system includes:

- Creation of clients.
- Creation of the orders.
- The transmission of orders (receptionist -> Photographer, receptionist -> Client).
- Price calculation based on order deadline (Mark it as express if necessary).
- Track of the consumables materials.
- Submissions of orders completed by the photographer.
- Generation of the reports (Revenue and consumables) with getters, so the administrator can view them whenever they want.

The system does not include:

- The development of film/printing images.
- Payment system.
- The transfer of printed images/developed film from the photo studio to the customer.
- Replenishing the materials

Benefits:

- Quick distribution of orders
- Easy reporting/concise overview for administrator
- Automate the generation of the reports

Key features:

- Automatic price increase on orders in case of urgent orders
- Generation of different orders for the photographer and the client
- Generation of the reports

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2. System Overview / Architectural Context

<High-level description of the architecture and components. A simplified diagram can be included to show layers (e.g., UI, Service, Data) or main modules. This section establishes the overall design philosophy and dependencies.

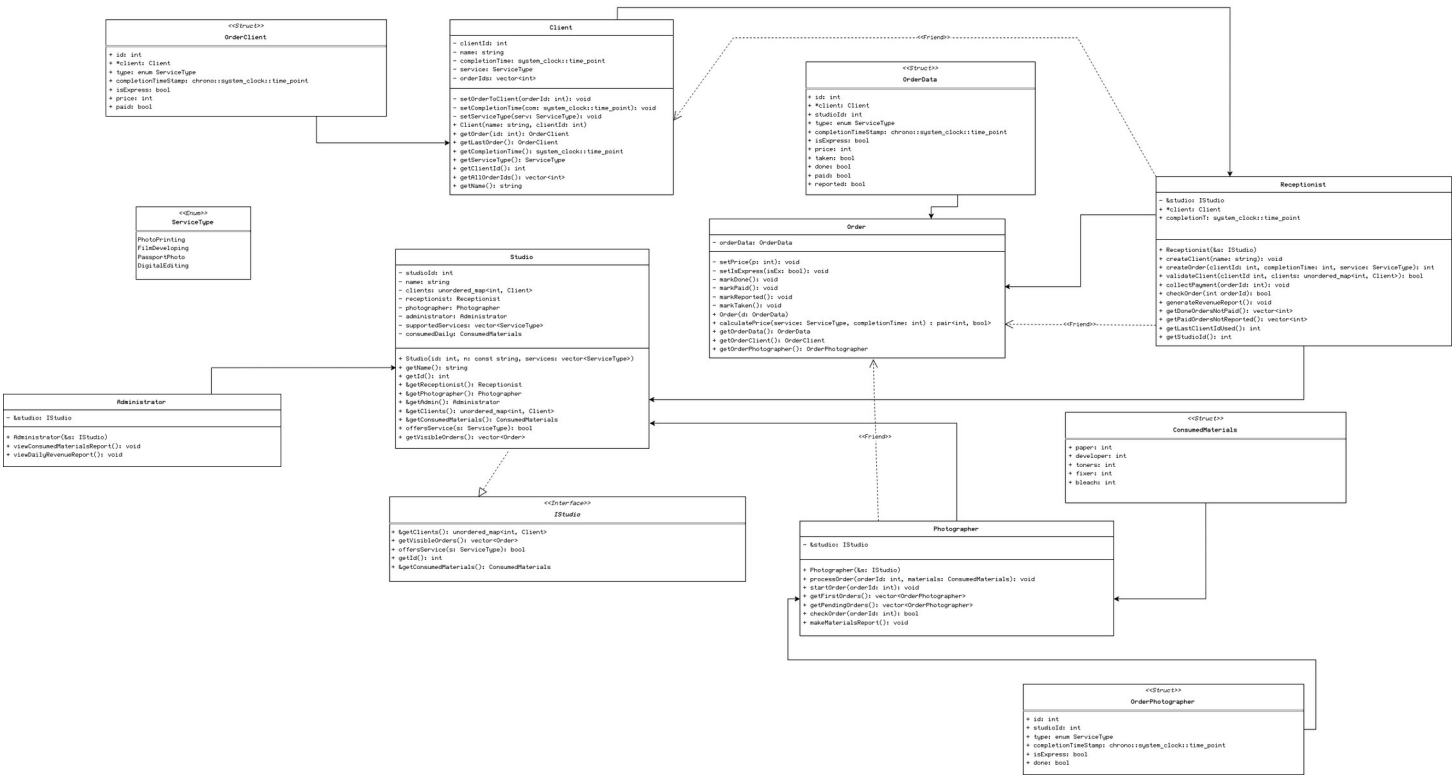
Example:
- Presentation Layer (UI / ConsoleUI)
- Logic Layer (Manager, Services)
- Data Layer (Repositories, FileService)
Each layer interacts only with the one directly below it. Include a simple schematic or diagram to illustrate dependencies (UI → Logic → Data).>

Presentation layer – CLI

Logic layer – Administrator, Photographer, Receptionist, Report generation

Data Layer – text files for storing and retrieving reports

3. UML Class Diagram (Technical Design)



4. Class Specifications

<Description:
Detailed description of each class. For every class, specify:

- Purpose (responsibility)
- Attributes (with types and short explanation)
- Methods (signatures and short description)
- Constraints / Contracts (preconditions, postconditions, invariants if applicable)

A tabular format is recommended for readability, for example: >

Class	Type	Description	Attributes	Methods
Client	Client	Store information about client's order(s)	clientId: int name: string completionTime: system_clock::time_point service: ServiceType orderIds: vector<int>	Client(string name, int clientId) SetOrderToClient(int orderId) setCompletionTime(system_clock::time_point com) setServiceType(ServiceType serv) getOrder(int id) → OrderClient getLastOrder() → OrderClient getCompletionTime() → system_clock::time_point getServiceType() → ServiceType getClientId() → int getAllOrderIds() → vector<int> getName() → string

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Receptionist	Studio Employee	Creates clients and orders, reports on daily revenue	&studio: Istudio *client: Client completionT: system_clock::time_point	Receptionist(&s: Istudio) createClient(name: string) createOrder(int clientId, int completionTime, ServiceType service) → int validateClient(int clientId, unordered_map<int, Client> clients) → bool collectPayment(int orderId) checkOrder(int orderId) → bool generateRevenueReport() getDoneOrdersNotPaid() → vector<int> getPaidOrdersNotReported() → vector<int> getLastClientIdUsed() → int getStudioId() → int
Order	Order	Calculates price (express or not), stores order data	orderData: OrderData	Order(OrderData d) setPrice(int p) setIsExpress(bool isEx) markDone() markPaid() markReported() markTaken() calculatePrice(ServiceType service, int completionTime) → pair<int, bool> getOrderData() → OrderData getOrderClient() → OrderClient getOrderPhotographer() → OrderPhotographer

Photographer	Studio employee	Start and process orders, validate orders to be completed	&studio: IStudio	Photographer(Istudio &s) processOrder(int orderId, ConsumedMaterials materials) startOrder(int orderId) getFirstOrders() → vector<OrderPhotographer> getPendingOrders() → vector<OrderPhotographer> checkOrder(int orderId) → bool makeMaterialsReport()
Administrator	Studio employee	View report of consumed materials and daily studio revenue	&studio: IStudio	Administrator(Istudio &s) viewConsumedMaterialsReport() viewDailyRevenueReport()
Studio	Studio	Contain employees, checking of whether a service is applicable at that studio	studioId: int name: string clients: unordered_map<int, Client> receptionist: Receptionist photographer: Photographer administrator: Administrator supportedServices: vector<ServiceType> consumedDaily: ConsumedMaterials	Studio(int id, const string n, vector<ServiceType> services) getName() → string getId() → int &getReceptionist() → Receptionist &getPhotographer() → Photographer &getAdmin() Administrator &getClients() → unordered_map<int, Client> &getConsumedMaterials() → ConsumedMaterials offersService(ServiceType s) → bool getVisibleOrders() → vector<Order>

IStudio	Interface	Accessing of Studio functions without having declared Studio	-	&getClients() → unordered_map<int, Client> getVisibleOrders() → vector<Order> offersService(ServiceType s) → bool getId() → int &getConsumedMaterials() → ConsumedMaterials

5. Interfaces and Abstractions

<Document all interfaces and abstract classes that support modularity, testing, or future extension. Specify the purpose, key methods, and release when each is planned to appear.
Examples include IClock, IReportable, and FileService.

Interface	Purpose	Key Methods	Planned For (Release)
IStudio	Allow Receptionist and Photographer to access Studio methods without declaring Studio	&getClients() → unordered_map<int, Client> getVisibleOrders() → vector<Order> offersService(ServiceType s) → bool getId() → int &getConsumedMaterials() → ConsumedMaterials	

6. Function Responsibilities

< Describe the purpose and data flow of each key function or method. This section defines what each function does, what data it uses, and what it produces. >

Class	Method	Purpose	Input	Output	Notes
Order	calculatePrice	Calculate price of service (Add express to normal price)	Service, completion time	Total price, isExpress: bool	-
Order	getOrderClient	Return the	-	orderClient	The output

		client's order			contains all the information needed in the client's order
Order	getOrderPhotographer	Return the photographer's order	-	orderPhotographer	The output contains all the information needed in the photographer's order
Client	setOrderToClient	Tie an order ID to a client	orderId	-	-
Client	getOrder	Get an order for the client based on the ID of the order	Order ID	OrderClient	-
Receptionist	createClient	Create a client in the given studio	name	-	-
Receptionist	createOrder	Create an order object with given values and return it's id	ClientId, completion time, type of service	Order ID	-
Receptionist	validateClient	Validates the supplied client	Client ID, list of clients	bool	-
Receptionist	collectPayment	Mark an order as paid if it is done and not yet paid for	Order ID	-	-

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Receptionist	checkOrder	Check that supplied order ID is in local studio	Order ID	bool	
Receptionist	generateRevenueReport	Create a daily revenue report file	-	-	-
Photographer	processOrder	Processes the order, meaning sets the order as done and uses materials	Order ID, used materials		
Photographer	startOrder	Mark an order as taken if it is not already	Order ID		
Photographer	makeMaterialsReport	Create a daily used materials report file			
Administrator	viewConsumedMaterialsReport	View consumed materials report			Opens the file generated by Photographer
Administrator	viewDailyRevenueReport	View daily revenue report			Opens the file generated by Receptionist
Studio	Getters for the studio's name, id, receptionist photographer, administrator, types of services				

7. Operation Flow

< Explain the logical flow of operations and how components interact between layers. A diagram or textual flow description should show data movement and control sequence. >

Example: ConsoleUI → Manager → Service → Repository → Report.

1. When a new client comes in, the receptionist needs to create a client object to assign its id and name.

    - The id will be automatically incremented every time a client is created.
    - Receptionist inputs the name.

2. After that the receptionist will create the order (createOrder()).

    - Input the clientId (can query the getLastClientIdUsed()), completionTime and the service type.
    - Creation of the main order struct with the inputs of the receptionist, with an orderId (automatically incremented as well).
    - Create an object order by passing the struct we just created.
    - Calculates the prices and if it is express (<= 24h) and set them into the struct that is inside the object order.
    - It generates two types of orders (client and photographer) and sets them into structs (orderClient and orderPhotographer) into the order object, so we can access the three structs through the same object.
    - Adds the id of the order into the array of Ids inside the client object.
    - Push the order object into the mapping of mainOrders.

NOTE: at this point all the orders are created and accessed through an order object. This order object can be accessed from inside the global mainOrders mapping by knowing the id.

3. Photographer processes the orders (will have view functions to query the orders that need to be done)

    - Inputs the order id completed and the materials used for that order.
    - Marks the order as done on both structs (orderphotographer and orderdata) inside the order object.

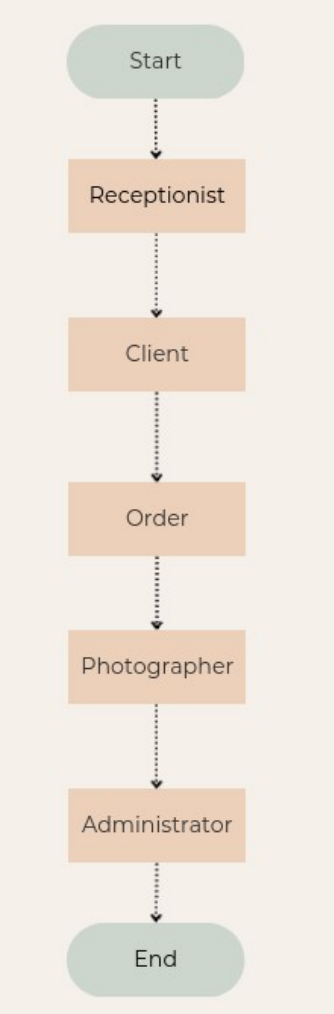
- There will be a global variable of type struct (consumedDaily), so the materials consumed for that order will be added into that variable (later will help us to make the report for the admin).

4. Once the orders are done, the receptionist can charge the clients and mark the order as paid (will have a getter for the orders done and not paid).

5. At the end of the day the receptionist will need to create a revenue report for the admin (will have a getter for the order paid and not reported).

6. The photographer needs to create his report of daily used materials as well.

- The same as for the revenue report, but easier on the logic, as we will have the global variable consumedMaterials already summed up. Store that value and reset the variable for the next day.



8. Enumerations & Constants

<List all configuration parameters, enumerations, and constants used in the design. >

Name	Value / Type	Description
enum ServiceType	{PhotoPrinting, FilmDeveloping, PassportPhoto, DigitalEditing}	Supported services

9. Validation Rules & Future Work

< Describe validation logic, exception handling, and planned functionality for future releases. Include placeholder designs and indicate which features are scheduled for Release 3 or beyond. >

Rule / Planned Feature	Description	Target Release

10. Traceability Matrix

< Map each requirement from the SRS to its corresponding implementation element in this DLD. This ensures consistency and complete coverage between requirements, design, and code. >

Example:

Requirement (SRS)	**Class / Method (DLD)**
"As the studio administrator, I want the photographer to have an efficient workflow with as minimal overhead as possible, so that the orders are completed more quickly"	Photographer::startOrder(int orderId) Photographer::processOrder(int orderId, ConsumedMaterials materials) Photographer::makeMaterialsReport()
"As the receptionist, I want to forward orders with accurate information so that I don't give out wrong orders."	Receptionist::createOrder(int clientId, int completionTime, ServiceType service)
"As the receptionist, I want to have orders generated within a matter of seconds, so that the customer and photographer don't have to wait long for them."	Receptionist::createOrder(int clientId, int completionTime, ServiceType service)
"As the receptionist, I want to automatically calculate daily income so that I don't report wrong numbers."	Receptionist::generateRevenueReport()
"As the photographer, I want to have clear deadlines so that I can complete orders in a sensible sequence."	Photographer::getFirstOrders()
"As the photographer, I want to have an automatic system to calculate daily resource usage so that I don't have to keep track of it and less mistakes	Photographer::makeMaterialsReport()

Requirement (SRS)	**Class / Method (DLD)**
happen.”	
“As the client I want to easily place my order so that getting my photo printed doesn’t take me longer than it needs to.”	Receptionist::createClient(string name) Receptionist::createOrder(int clientId, int completionTime, ServiceType service)

11. Code Structure and File Mapping

< Map all classes and modules to their respective C++ source and header files. This ensures traceability between design and implementation. >

Example table:

Class	File
Client	main.c++
Receptionist	main.c++
Order	main.c++
Photographer	main.c++
Administrator	main.c++
Studio	main.c++
IStudio	main.c++

12. Revision History

<Track document changes across releases. >

Date	Version	Change Summary	Author